ERIC Document Resume	See Instruction Sheet	DATE OF RESUME 7/18/65	DATE RECEIVED

A. PUBLICATION DATA

1. ERIC NUMBER	2. ORIGINATOR CONTROL NO(S).	3. IDENTIFICATION NO.
ED000078	7416	N.A.

4. AUTHOR(S):
Anderhalter, O.F.

5. TITLE OF DOCUMENT ABSTRACTED:
Departmental Grading at St. Louis University

6. PUBLICATION TITLE:
N.A.

7. EDITOR(S):
N.A.

8. PLACE OF ORIGIN
ORG. St. Louis Univ.
ST. St. Louis, Mo.
CITY, STATE

9. PUBLISHER OR SOURCE
St. Louis University

10. VOL.	11. PAGES	12. MO./YR.	13. TOTAL PP.
N.A.	N.A.	5.	11

TELE. EXT.
INST/LOC CODE

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TYPE OF REPORT
PROPOSAL ☐
IN-PROGRESS ☐
FINAL ☒
FOLLOW-UP ☐

OTHER ERIC REFERENCES:

ERIC SATELLITE CODE

B. INDEXING DATA

14. SUBJECT AREA

15. TYPE OF ENDEAVOR
experimental study

16. INDEXING TERMS (6-12)
experimental studies
ability
evaluation
students

17. ABSTRACT (MAX. 250 WORDS)

This study, conducted by the Bureau of Institutional Research at St. Louis University under the direction of O. F. Anderhalter, analyzes the differences in level of grades assigned by various departments and the degree to which the grades given are related to the potentialities of the students graded.

ERIC No.

18. SOURCE OF ABSTRACT

C. FUNDING DATA

19. SUPPORTING ORGANIZATION

20. DIVISION OR DEPT.

21. CONTRACT NO.
PROJECT NO.

22. TOTAL COST OF PROJECT

23. DURATION OF PROJECT

U.S. Department of Health, Education, and Welfare
Office of Education

ERIC Form 1

#7416
5-11
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DEPARTMENTAL GRADING AT SAINT LOUIS UNIVERSITY

(Study conducted by the Bureau of Institutional Research for the Board of Undergraduate Studies--Study directed by O. Anderhalter)

Purpose.--In view of the fact that no specific standards for interdepartmental grading have been established, it is presupposed that differences in standards of, as well as basis for, grading do exist among the various departments and schools of the University. The purpose of this study is to provide exploratory information concerning whether or not such differences do actually occur, and the extent of these differences if they do occur.

The study is broken down into two more or less related types of analysis, the first intended to indicate differences in the level of grades assigned by various departments and the second to determine the degree to which grades given are related to the potentialities of the students for whom the grades were given.

Data Available--Information available for the analysis included:

1) the names of all freshmen students taking courses in each department in the fall of 1950
2) the letter grade assigned to each student in each department for courses in the fall of 1950
3) the score on the A.C.E. Psychological examination for all freshman students, and
4) the rank given each student in his high school graduation class.

In the following sections, the manner in which the data is analyzed as well as the result of the analysis is presented separately for these two phases of the study.

Part A--Differences in Level of Grading

Overall Plan.--It became immediately apparent, that in order to compare the level of grading by the various departments, some attention must be given to the level of abilities of the students taking courses in the different departments. While such factors as motivation, interest, attitude toward school, etc. should also be considered, such measures are not feasible to obtain--and it is feasible to assume (when the number of students is fairly large) that the number of students working above or below capacity is fairly constant between students in different departments (This is particularly feasible in this study since many of the same students are taking courses in the different departments).

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If then, differences of abilities of students were taken into account, it would be possible to compare average grades assigned to the students by a department, with the average grade expected from a knowledge of the level of ability of the students. This comparison would provide information concerning the level of grading by the department. To illustrate with an extreme case, it would be possible for one department, possessing very poor students, to give these students all C's or above; while another department, possessing all good students, to give these students all C's and below. In such a case it would be reasonable to assume that the grading standards of the second department were considerably lower than those of the first department.

Procedure & Results.--With this overall plan in mind, the following procedure, along with results, was followed:

1. A list was obtained of all students taking courses in each of the departments, along with the grade assigned each student by that department.

   This list is not incorporated in this report due to its size.*

2. By assigning a mark of 4 for an A, 3 for a B, etc., an average credit point average of students' marks in each department was obtained. These average credit point averages are recorded in column 1 of Table one in the appendix, with the number of students on which this average was based included in parenthesis after the average.

3. The expected success of each student (independent of the department in which he took courses) was next determined. This was done through the following steps:

   a) The coefficient of correlation between A.C.E. and total credit point average (i.e., credit point average of students figured on all courses taken--) was computed, along with the correlations between high school rank and credit point average, and between high school rank and A.C.E. The values for these correlations were .493, .532, and .306 respectively.

   b) The multiple coefficient of correlation, indicating the relationship between a combined measure of A.C.E. and High school rank, with Credit point average, was next

* This list as well as all computational materials, as the charts for the 60 coefficients of correlation, etc., are on file in the Bureau.

computed. The value of this multiple coefficient of correlation was .632. This seems to indicate that the combination of high school rank and A.C.E. is a fairly accurate indication of probable college success.

5. The multiple regression equation was computed from the multiple coefficient of correlation. This regression equation indicates the weighting to give each of the measures so that the composite measure best indicates college success. The regression equation was*:

Predicted C.P.A. = .0145 High School Rank + .0094 ACE + .571407

To illustrate the use of this equation, if a student had a high school rank at the 90th percentile, and an A.C.E. score at the 70th percentile, his expected success in terms of credit point average would be:

(.0145) (90) + (.0094) (70) + .571407 = 2.5344

6. The multiple regression equation was computed for all students, then listed after their names on the master list by departments. This measure was referred to as the potentiality index for the student, since it gave the best estimate of probable success. This measure is in terms of expected credit point average.

7. The average potentiality index of students taking courses in each department was next computed. These results are recorded, by departments in column 2 of table one of the appendix. To illustrate, if the value of 3.00 was listed for a department, it would indicate that the abilities of the students taking courses in that department were such that an average grade point average of 3.00 was expected.

8. The difference between expected success and grade point average given by the department (or difference between number in column 1 and column two) is recorded in column 3 of this table. Thus, if the number -.50 appears in column 3, it indicates that the average credit point average was .50 below what was expected from the abilities of the students enrolled in that department. It should be mentioned,

* A graphical method for obtaining this predicted C.P.A. is included, with directions, [illegible] in the appendix.

that the average expected credit point average for all students in all departments, when computed through this regression equation, is identical to the actually attained average credit point average for all students.

Limitation & General Comments.-- The results of this study are subject to a number of limitations, some of which are discussed here.

1) Only first semester grades were used. The grading by department may not be indicative of grading in general for that department over the entire curriculum since only first semester grades for freshmen were used.

2) Only the high school rank and A.C.E. scores were used as a basis for determining potentiality of the students. This limitation was one of necessity, since no other measures were available--actually, the multiple coefficient of correlation was high enough to warrant basing the analysis on these two measures.

3) The study does not give an absolute indication of level of grading since no outside standard was available. Instead, all levels are relative to levels used by other departments in the University.

4) A number of factors which might influence the results of grades by a department were not taken into account. Thus, two students with equal potentialities, taking courses in two different departments, might receive different marks due to differences in effort, motivation, etc. However, since the high school rank was considered in the formation of the potentiality index, and since such factors as effort, motivation, etc. would also have influenced the high school rank, it is likely that a person highly motivated would have had a high potentiality index in the first place. It is also feasible to assume that such factors are likely to work equally in all departments.

In summary, it might be said that the results do indicate some differences in levels of grading. No attempt is made to indicate whether any one set of standards is correct, since even the average of grading for all departments may not be desirable. As a result, the study should perhaps have its chief advantage lie in its exploratory nature, rather than as a final evaluation study.

Part B--Correspondence of Grades to Abilities

Purpose.-- While the previous study was concerned primarily with the agreement of average level of grades given to average level of potentialities of students this phase is more concerned with the correspondence of grades given to the individual students with the potentialities of these same students. It is possible that a department might grade high (i.e., the average level might be far above the average for all departments, when the average potentiality of the students is only average), yet, the grades given might correlate highly with potentialities of students. This can be exemplified very briefly. Suppose that two departments have exactly the same students (so that the potentialities of the students would be the same), and suppose that the level of potentiality indicated that the average grade point average expected is 2.00. Now suppose that the first department gave grades such that the average CPA was 3.00 while the second gave grades such that the average CPA was 2.00. In so far as level of grading is concerned, it appears that the second department grades closer to that of all departments than does the first department. However, it is possible that within the second department, the students with the highest relative potentialities received the poorest grades, the students with the lowest potentialities received the highest grades, etc. Obviously, the correlation between grades and potentialities is here negative. On the other hand, the first department, even though grading higher than the standard (with the standard here being the overall grading of all departments as a whole), may have given grades such that the students with the highest potentialities received the higher grades, the students with the lower potentialities received the lower grades, etc. Here, the correlation of grades to potentiality would be positive.

This example evidences the fact that this second phase of the study actually supplements the first phase. Under the assumption that the measures used to determine the potentiality index are suitable for indicating possibility of success, these correlations give some indications concerning the suitability of standards for grading.

Procedure & Results.-- The first thing that had to be done was to decide on a method which would yield a desirable measure of relationship for this type of data. A product-moment coefficient would not work because one of the traits (the grades) is not on a continuous scale. A measure referred to as a contingency coefficient would give a measure where one trait is continuous, and the other falls into categories such as A's, B's, etc. However, it was felt that such a measure is not desirable, since one is not concerned whether the high school rank or A.C.E. or potentiality index discriminates finely, as between an A and a B, or a D and F---rather, it is usually desirable to have an index which will pick out Good, or Poor, students. To illustrate this idea, consider the distributions in table two of the appendix. The top half of the distribution indicates the frequencies of scores made on the A.C.E. by freshmen who later made A's, compared with the frequencies of scores on the A.C.E. by freshmen who later made B's. It can be seen that there is not much difference between these two. This actually represents the distribution of scores for all freshmen students. Now, consider the bottom half of this table, where the left hand distribution represents the distribution of A.C.E. scores for students later making A's or B's, and the right hand distribution represents the distribution of A.C.E. scores for students later making C's or F's. It is obvious that the A.C.E. is valuable for indicating discriminations of the latter sort, but practically useless for making the finer discriminations required in the top half of the table.

The biserial coefficient of correlation, yielding similar index to the common product-moment (i.e., from -1.0 to +1.0) can be adapted to measure the second (or bottom half) type of relationship. In the case of the A.C.E. for all students, as represented in the bottom half of table 2, the measure of biserial correlation yields an index of .728, which indicates a high degree of relationship*.

This biserial coefficient of correlation was used to determine all of the correlations found--consisting of correlations between A.C.E. and Grades, high school rank and

* It can be noted that the product-moment r, yielding index of value for exacting discrimination was .493. Thus the ACE is far more valuable for broad discriminations.

grade, and potentiality index and grade--for all departments. These correlations are recorded in columns 4, 5, and 6 of table one in the appendix.

Limitations & General Comments.-- The chief limitation of these results is the fact, that theoretically, a low correlation in any case may not necessarily mean that the grading standards are not good; but may instead indicate that the particular index (whether high school rank, A.C.E. or potentiality index) does not properly indicate success in the type of materials taught by that department. In view of the fact that the correlation over all departments is at the level that it is, this is not a likely interpretation, but is nevertheless a possible one.

Another limitation lies in the fact that, assuming the index suitable for indicating success, changes in the individuals--such as increased interest in school work, decreased interest in school work, increased or decreased attitude or motivation, etc.--may be responsible for lowered correlation. It is not likely that these factors would change the correlations completely to the negative side, or even to zero, however. This is particularly true in view of the type of correlation used, where only broad discrimination is indicated. The limitations mentioned for the first phase concerning the small number of students in some cases, and the use of only 1st semester freshmen scores, also hold for this phase.

GENERAL SUMMARY

It can not be stressed toostrongly that the results of both studies included in this report are exploratory rather than final evaluation results. They may, if properly used, give cues for further analysis and investigation, and eventual improvement of grading systems in the University.

GENERAL CONCLUSIONS

From the data in table one column three, it can be noted that, for the most part, the grading standards are fairly consistent from department to department. In most cases where the departure is large, the number of students involved is relatively small. These statements are true with a few exceptions of course.

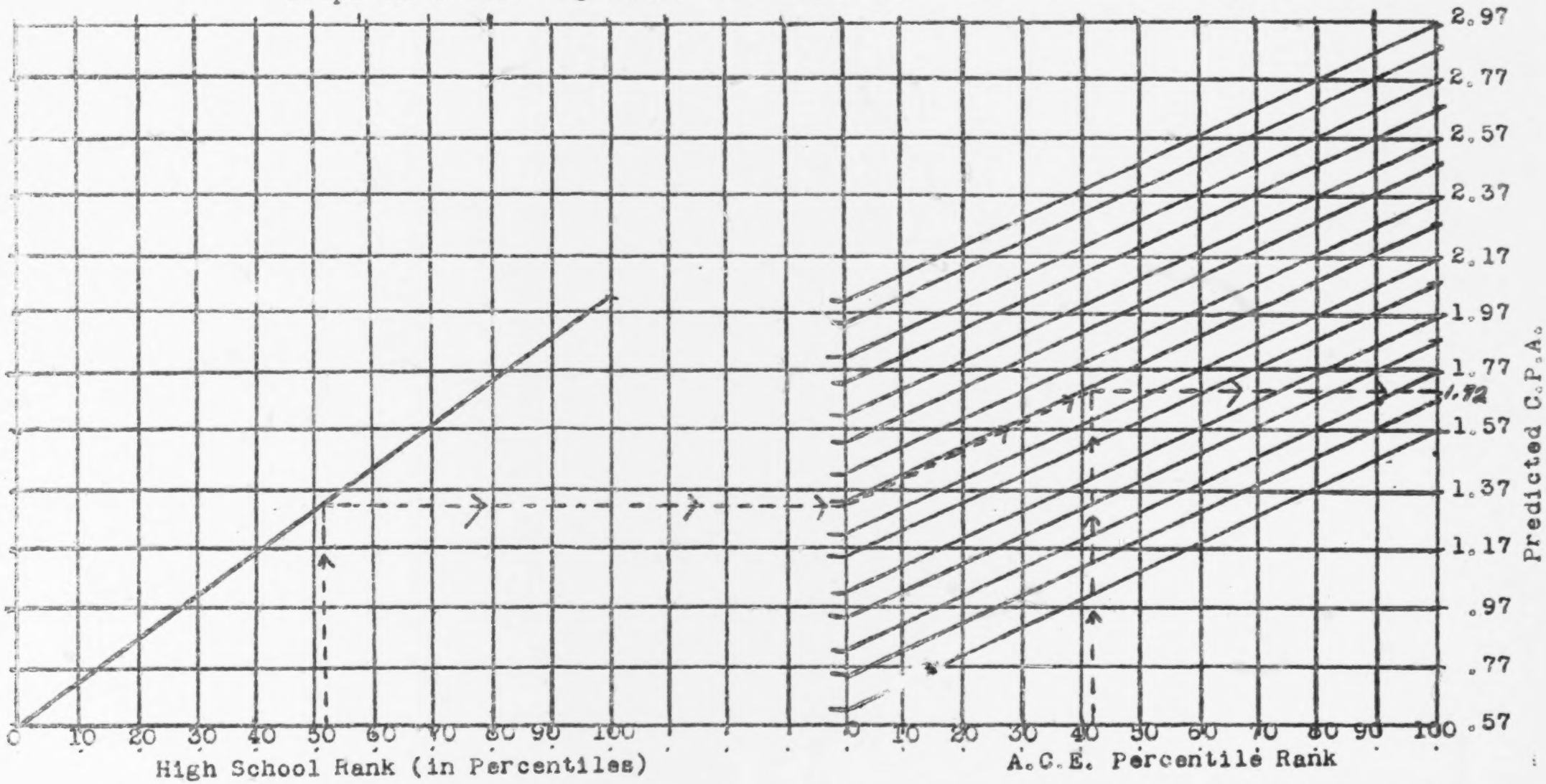
It should once again be emphasized that the data recorded in column three is based only on standards relative to standards of other departments in the university, that is, a plus .37 for example, does not indicate that the department gives grades on the average of .37 credit points higher than some predetermined outside standard; but rather that on the basis of the caliber of students involved, the grades given represent an average of .37 credit points higher than many over the university as a whole for this caliber of students.

By inspection of the last three columns of this table, it can be seen that in most cases there is a fairly high degree of consistency between potentiality of students and the level of grades assigned to students. In general it can be noted that in most cases where the results in column three were small, the values of the correlations were high, indicating that where there is a tendency of the grades to conform to the overall university standards, there is also a tendency for grades to relate to the ability level of the students. It should once again be pointed out, that the correlations involved as previously described, indicated broad discrimination between students rather than the fine discriminations indicated by the product moment coefficient of correlation.

In summary one can conclude that both the high school rank and A.C.E. are fairly good indicators of success in most departments and that if there exists a prevalence of grading too high or too low in the university, this prevalence is fairly consistent from department to department with a few outstanding departures.

Figure one

Graph for Predicting C.P.A. when High School Rank and A.C.E. Score are Known



Directions.--Locate the High School Rank on the left hand scale and read up to the line above. Next read straight over to the right till you reach one of the lines on the right hand side. Now, locate the A.C.E. score on the right hand side and read up until you hit the line previously determined. From this point read directly across for the predicted C.P.A.
Illustration.--When the high school rank is 52, and the A.C.E. is 42, the regression equation predicts a CPA of 1.72. The arrows on the graph illustrate how this value is obtained from the graph. *(Note that each mark on the CPA scale represents .2 of a unit)

TABLE I

Dept.	Number of Students	Average Gr. Point Average	Average Potential Index	Departmental Grading Index	Relation Between ACE & Grades	Relation Between High School Rank and Grades	Relation Between Potentiality Index & Grades
AC	116	2.28	1.80	+ .48	.70	.56	.74
AMS	169	2.13	2.06	+ .07	.77	.70	.88
BL	57	1.49	2.25	- .76	.08	.81	.55
CH	154	2.17	1.78	+ .39	.68	.42	.69
EC	111	2.18	1.81	+ .37	.89	.93	.98
EG	45	2.42	2.14	+ .28	.90	.13	.22
EN	437	2.25	2.03	+ .23	.81	.66	.84
FR	39	2.51	2.24	+ .27	.89	.62	.89
GR	100	2.03	2.38	- .35	.52	.62	.80
HS	87	2.10	2.00	+ .10	.78	.77	.89
LT	20	2.55	2.28	+ .29	.99	.99	.99
MT	354	2.19	2.08	+ .11	.52	.44	.58
NR	17	3.11	1.51	+1.60	.0	.0	.0
PE	222	2.85	2.18	+ .67	.38	.01	.61
PH	46	2.15	2.24	- .09	.74	.95	.86
PL	320	2.13	2.05	+ .08	.58	.64	.80
PS	23	1.56	1.50	+ .06	.55	.78	.79
RL	105	2.19	1.81	+ .38	.62	.50	.64
SC	20	2.00	1.36	+ .64	.87	.84	.99
SP	47	1.95	2.13	- .18	.25	.43	.48

Table 2
Comparison of Discrimination by A.C.E. under Two Situations

A.C.E.	Frequency by Students with A's	Frequency by Students with B's
95-99	𝍸 𝍸 𝍸 |||	𝍸 𝍸 ||||
90-94	𝍸 ||	𝍸 ||
85-89	𝍸 𝍸 |	𝍸 |||
80-84	𝍸 |	𝍸 ||
75-79	𝍸 ||	𝍸 𝍸
70-74	𝍸 |	|||
65-69	𝍸	𝍸 |
60-64	𝍸 ||	|
55-59	||	|||
50-59	||||	|||
45-49	𝍸 |||	||||
40-44	||	||
35-39	||	
30-34	|	|
25-29	|	|
20-24	|	||
15-19		||
10-14		
5-9	||	
0-4		

A.C.E.	Frequency by Students with A's or B's	Frequency for D's or F's
95-99	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||	|
90-94	𝍸 𝍸 𝍸	|
85-89	𝍸 𝍸 𝍸 ||||	|||
80-84	𝍸 𝍸 |||	|||
75-79	𝍸 𝍸 𝍸 ||	𝍸 ||
70-74	𝍸 ||||	𝍸 |
65-69	𝍸 𝍸 |	𝍸
60-64	𝍸 ||	|||
55-59	𝍸	𝍸 |
50-54	𝍸 ||	|||
45-49	𝍸 𝍸 ||	𝍸
40-44	||||	𝍸 𝍸 𝍸
35-39	||	𝍸 |
30-34	||	||
25-29	||	𝍸 |||
20-24	|||	𝍸 𝍸 |||
15-19	||	𝍸 |||
10-14		𝍸
5-9		𝍸 |
0-4	||	𝍸

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